

**REMARKS**

This Preliminary Amendment is submitted to improve the form of the specification as originally-filed and to correct obvious errors. In addition, original claims 1, 5, 7-9, 11-13, 15-16, 22, 34-36 and 38-39 are amended, claims 2-4, 6, 23-30, and 40 cancelled, and new claims 41-47 are added. No new matter is added.

It is respectfully requested that this Preliminary Amendment be entered in the above-referenced application.

If there are any additional fees associated with filing of this Preliminary Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date:

*January 23, 2002*

By:

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

### IN THE SPECIFICATION:

Please REPLACE on page 14, paragraph one (1), on page 15, paragraph two (2) and on page 27, paragraph two (2) with the following new paragraphs:

In general, resins change in refractive index before and after curing. Hence, in order to attain the desired refractive index after curing, the composition of the resin must be determined taking account of the changes in refractive index before and after curing. Accordingly, in respect of the above resin composition, changes in refractive index before and after curing have been studied in detail. As the result, it has been ascertained that the refractive index after curing comes to 1.55 or more when the refractive index before curing is 1.52 or more. Thus, the photosensitive resin composition in the present invention may preferably have a refractive index before curing of 1.52 or more.

As a result of extensive studies, the present inventors have discovered that a di(meth)acrylate represented by the following Formula (1) is particularly preferred as the component (A). Of the di(meth)acrylate represented by Formula (1), one having a molecular weight of 1,000 or less is more preferred because of its [small] large refractive index.

Incidentally, the mechanism is unclear as to the phenomenon that the light transmittance and degree of cure of the resin are improved by the heating. It, however, can be presumed that, the heating accelerates the post-curing (a phenomenon that the curing of photosensitive resin proceeds gradually also after exposure) of the resin to enhance the degree of cure, and also, since in the heating step the curing reaction proceeds [without the exposure], the chemical structure of the resin is not destroyed by light and on the contrary any slight absorption sources caused in the resin layer at the time of curing are remedied on.

Please DELETE paragraph two (2) on page 39, lines 12-14.

[Physical properties of the resin composition before curing and of the resin after curing which were measured in the same manner as in Example were as shown in Table 1.]

**IN THE CLAIMS:**

Please CANCEL claims 2-4, 6, 23-30 and 40 .

Please AMEND the following claims 1, 5, 7-9, 11-13, 15-16, 22, 34-36 and 38-39:

Please ADD the following claims 41-47:

1. (ONCE AMENDED) An optical element comprising:

a base member; and

a resin layer formed on the surface of the base member and comprising a cured product of a photosensitive resin composition, wherein said resin layer has at least one of the following features:

(a) a refractive index of 1.55 or more,

(b) a visible-light inner transmittance of 95% or more in a 100  $\mu$ m thick area,

(c) a rate of hygroscopic dimensional change of 0.4% or less,

(d) a durometer hardness of HDD 70 or more; and

(e) a glass transition temperature of 95°C or above.

2. (cancel)

3. (cancel)

4. (cancel)

5. (ONCE AMENDED) The optical element according to [any one of claims 1 to 4] claim1, [comprising:

the base member;

and the resin layer formed on the surface of the base member and comprising a cured product of a photosensitive resin composition;]

wherein said resin layer having a gel percentage of 95% or more.

AMEND-20230111

6. (cancel)

7. (ONCE AMENDED) The optical element according to [any one of claims 1 to 6] claim 1, [comprising;

the base member; and

the resin layer formed on the surface of the base member and comprising a cured product of a photosensitive resin composition;]

wherein said photosensitive resin composition having a rate of shrinkage on curing of 7% or less.

8. (ONCE AMENDED) The optical element according to [any one of claims 1 to 7] claim 1, wherein said resin composition comprises:

(A) a polyfunctional (meth)acrylate;

(B) a polyfunctional urethane-modified (meth)acrylate; and

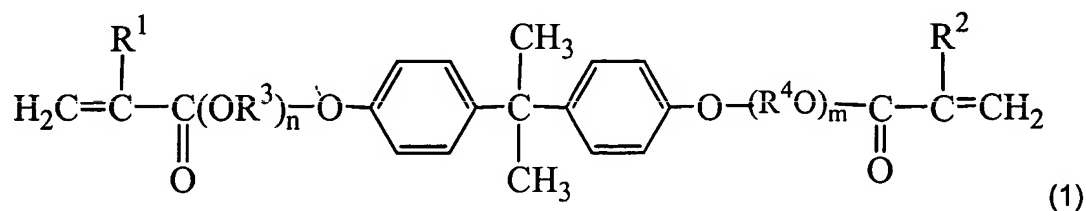
(C) a photopolymerization initiator.

9. (ONCE AMENDED) The optical element according to [any one of claims 1 to 8] claim 1, wherein said resin composition has a refractive index before polymerization curing of, 1.52 or more.

10. (UNAMENDED) The optical element according to claim 8, wherein said polyfunctional (meth)acrylate has a refractive index before polymerization curing, of 1.53 or more.

11. (ONCE AMENDED) The optical element according to [any one of claims 8 to 10] claim 8, wherein said polyfunctional (meth)acrylate has two or more benzene ring structures in one molecule.

12. (ONCE AMENDED) The optical element according to [any one of claims 8 to 11] claim 8, wherein said resin composition comprising, as at least a part of said polyfunctional (meth)acrylate, a di(meth)acrylate represented by the following Formula (1):

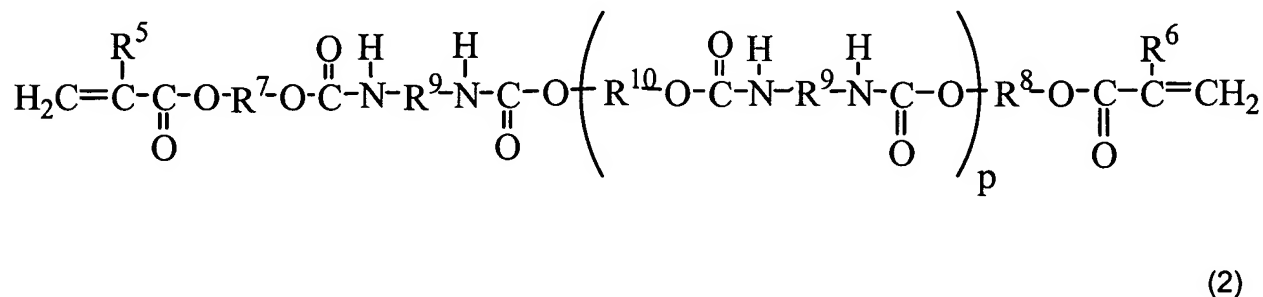


wherein R1 and R2 are each a hydrogen atom or a methyl group, R3 and R4 are each a hydrocarbon group having 2 to 4 carbon atoms, and m and n are each an integer of 1 or more.

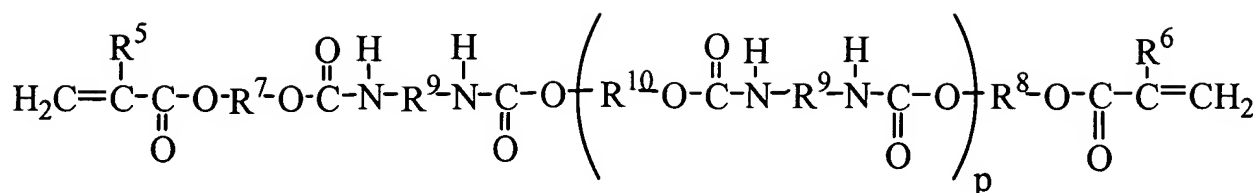
13. (ONCE AMENDED) The optical element according to [any one of claims 8 to 12] claim 8, wherein said polyfunctional (meth)acrylate has a molecular weight before polymerization curing, of 1,000 or less.

14. (UNAMENDED) The optical element according to claim 8, wherein said polyfunctional urethane-modified (meth)acrylate has a refractive index before polymerization curing, of 1.48 or more.

15. (ONCE AMENDED) The optical element according to [any one of claims 8 to 14] claim 8, wherein said polyfunctional urethane-modified (meth)acrylate contains at least one of compounds represented by any of the following Formulas (2) to (4):

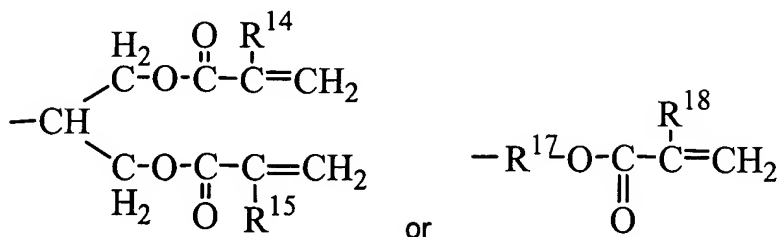


wherein R<sup>5</sup> and R<sup>6</sup> are each a hydrogen atom or a methyl group, R<sup>7</sup> and R<sup>8</sup> are each a hydrocarbon group having 1 to 10 carbon atoms, R<sup>9</sup> is an isocyanate residual group, R<sup>10</sup> is a polyol residual group or a polyester residual group, and p is 0 or an integer of 10 or less.

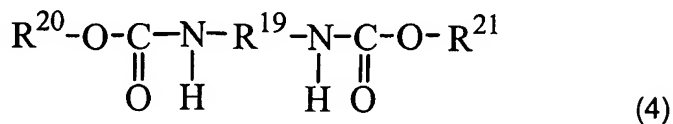


(3)

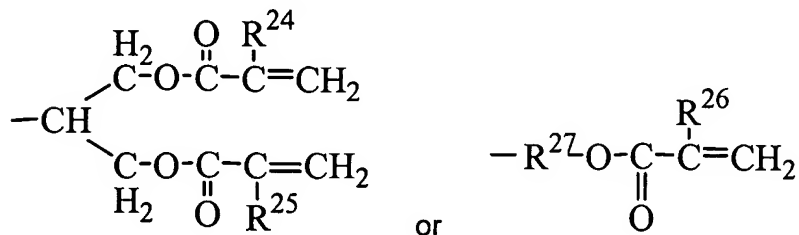
wherein  $\text{R}^{11}$  is a hydrocarbon group having 1 to 10 carbon atoms, and  $\text{R}^{12}$  is



wherein  $\text{R}^{14}$ ,  $\text{R}^{15}$  and  $\text{R}^{18}$  are each a hydrogen atom or a methyl group, and  $\text{R}^{17}$  is a hydrocarbon group having 1 to 10 carbon atoms;



wherein  $\text{R}^{19}$  is a hydrocarbon group having 1 to 10 carbon atoms, and  $\text{R}^{20}$  and  $\text{R}^{21}$  are each



wherein  $R^{24}$ ,  $R^{25}$  and  $R^{26}$  are each a hydrogen atom or a methyl group, and  $R^{27}$  is a hydrocarbon group having 1 to 10 carbon atoms.

16. (ONCE AMENDED) An optical article having the optical element according to [any one of claims 1 to 15] claim 1.

17. (UNAMENDED) The optical article according to claim 16, wherein;  
said optical element is a lens; and said optical article is a still camera.

18. (UNAMENDED) The optical article according to claim 16, wherein;  
said optical element is a lens; and  
said optical article is a video camera.

19. (UNAMENDED) The optical article according to claim 16, wherein;  
said optical element is a lens; and  
said optical article is an interchangeable lens.

20. (UNAMENDED) A process for producing a resin-cemented optical element, the process comprising:

a first exposure step of irradiating a photosensitive resin composition held between the surface of a base member and a mold tool, to cure the composition to form a resin layer;

a mold release step of mold-releasing the resin layer; and

a heating step of heating the resin layer,

in this order.

21. (UNAMENDED) A process for producing a resin-cemented optical element, the process comprising:

a first exposure step of irradiating a photosensitive resin composition held between the surface of a base member and a mold tool, with heating to cure the composition to form a resin layer; and

a mold mold release step of mold-releasing the resin layer,  
in this order.

22. (ONCE AMENDED) The production process according to claim 21, wherein the heating in said first exposure step is carried out at a temperature of from 40°C to 130°C.

23. - 30. (cancel under PCT Article 34)

31. (UNAMENDED) A process for producing a resin-cemented optical element, the process comprising one or more exposure steps of irradiating a photosensitive resin composition held between the surface of a base member and a molding tool, to cure the composition to form a resin layer;

at least one of said exposure steps being the step of irradiating the resin composition by light not comprising light with a wavelength of less than 300 nm.

32. (UNAMENDED) The process for producing a resin-cemented optical element according to claim 31, which further comprises a mold release step of mold-releasing the resin layer;

said step of irradiating the resin composition by the light not comprising light with a wavelength of less than 300 nm being a first exposure step carried out before said mold release step.



33. (UNAMENDED) The process for producing a resin-cemented optical element according to claim 31, which further comprises a mold release step of mold-releasing the resin layer;

said step of irradiating the resin composition by the light not comprising light with a wavelength of less than 300 nm being a second exposure step carried out after said mold release step.

34. (ONCE AMENDED) The process for producing a resin-cemented optical element according to [any one of claims 20, 21 and 32] claim 20, which further comprises, after said mold release step, a second exposure step of irradiating the resin layer by light not comprising light with a wavelength of less than 300 nm.

35. (ONCE AMENDED) The production process according to [any one of claims 31 to 34] claim 31, wherein the irradiation in the step of irradiation by the light not comprising light with a wavelength of less than 300 nm is performed shutting out light with a wavelength of less than 300 nm among light emitted from a light source.

36. (ONCE AMENDED) The production process according to any one of [claims 21 and 32 to 34] claim 21, which further comprises, after said mold release step, a heating step of heating the resin layer.

37. (UNAMENDED) The production process according to claim 33, which further comprises, after said second exposure step, a heating step of heating the resin layer.

38. (ONCE AMENDED) The production process according to [any one of claims 20, 36 and 37] claim 20, wherein the heating in said heating step is carried out at a temperature of from 40°C to 130°C.

39. (ONCE AMENDED) The production process according to [any one of claims 20, 21, 31, 32 and 33] claim 20, wherein said resin composition comprises:

- (A) a polyfunctional (meth)acrylate;
- (B) a polyfunctional urethane-modified (meth)acrylate; and
- (C) a photopolymerization initiator.

40. (cancel)

41. (NEW) The process for producing a resincemented optical element according to claim 21, which further comprises, after said mold release step, a second exposure step of irradiating the resin layer by light not comprising light with a wavelength of less than 300 nm.

42. (NEW) The process for producing a resincemented optical element according to claim 32, which further comprises, after said mold release step, a second exposure step of irradiating the resin layer by light not comprising light with a wavelength of less than 300 nm.

43. (NEW) The production process according to claim 36, wherein the heating in said heating step is carried out at a temperature of from 40°C to 130°C.

44 (NEW) The production process according to claim 37, wherein the heating in said heating step is carried out at a temperature of from 40°C to 130°C.

45. (NEW) The production process according to claim 21, wherein said resin composition comprises:

- (A) a polyfunctional (meth)acrylate;
- (B) a polyfunctional urethanemodified (meth)acrylate; and
- (C) a photopolymerization initiator.

46. (NEW) The production process according to claim 31, wherein said resin composition comprises:

- (A) a polyfunctional (meth)acrylate;
- (B) a polyfunctional urethanemodified (meth)acrylate; and
- (C) a photopolymerization initiator.

47. (NEW) The production process according to claim 32, which further comprises, after said mold release step, a heating step of heating the resin layer.

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Amendment under Article 34

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Attach-  
ment

IN THE SPECIFICATION

Please make an amendment as follows:

page 15, lines 17 to 18, change "its small refractive index" to  
"its large refractive index."

202210-2091E001

PCT/JP00/04922

### Amendment under Article 34

 $A^+$ 

**5. (amended)**

The optical element according to any one of claims 1 to 4,  
comprising:

the base member; and

the resin layer formed on the surface of the base member and comprising a cured product of a photosensitive resin composition, wherein said resin layer has a gel percentage of 95% or more.

 $A^+2$ 

**7. (amended)**

The optical element according to any one of claims 1 to 6,  
comprising:

the base member; and

the resin layer formed on the surface of the base member and comprising a cured product of a photosensitive resin composition, wherein said photosensitive resin composition has a rate of shrinkage on curing of 7% or less.

23. (cancelled)

24. (cancelled)

25. (cancelled)

26. (cancelled)

27. (cancelled)

28. (cancelled)

29. (cancelled)

30. (cancelled)

31. (added)

A process for producing a resin-cemented optical element, the process comprising one or more exposure steps of irradiating a photosensitive resin composition held between the surface of a base member and a molding tool, to cure the composition to form a resin layer, wherein

at least one of said exposure steps being the step of irradiating the resin composition by light not comprising light with a wavelength of less than 300 nm.

32. (added)

The process for producing a resin-cemented optical element according to claim 31, which further comprises a mold release step of mold-releasing the resin layer, wherein

said step of irradiating the resin composition by the light not comprising light with a wavelength of less than 300 nm being a first exposure step carried out before said mold release step.

33. (added)

The process for producing a resin-cemented optical element according to claim 31, which further comprises a mold release step of mold-releasing the resin layer, wherein

said step of irradiating the resin composition by the light

not comprising light with a wavelength of less than 300 nm being a second exposure step carried out after said mold release step.

34. (added)

The process for producing a resin-cemented optical element according to any one of claims 20, 21 and 32, which further comprises, after said mold release step, a second exposure step of irradiating the resin layer by light not comprising light with a wavelength of less than 300 nm.

35. The production process according to any one of claims 31 to 34, wherein the irradiation in the step of irradiation by the light not comprising light with a wavelength of less than 300 nm is performed shutting out light with a wavelength of less than 300 nm among light emitted from a light source.

36. (added)

The production process according to any one of claims 21 and 32 to 34, which further comprises, after said mold release step, a heating step of heating the resin layer.

37. (added)

The production process according to claim 33, which further comprises, after said second exposure step, a heating step of heating the resin layer.

38. (added)

The production process according to any one of claims 20, 36 and 37, wherein the heating in said heating step is carried out at a temperature of from 40°C to 130°C.

39. (added)

The production process according to any one of claims 20, 21, 31, 32 and 33, wherein said resin composition comprises:

- (A) a polyfunctional (meth)acrylate;
- (B) a polyfunctional urethane-modified (meth)acrylate; and
- (C) a photopolymerization initiator.

40. The optical element according to any one of claims 1 to 4, comprising:

the base member; and

the resin layer formed on the surface of the base member and comprising a cured product of a photosensitive resin composition, wherein said resin layer has a glass transition temperature of 95°C or above.